

Notice of Allowability

Application No.

10/663,553

Examiner

Roberto Rábago

Applicant(s)

LI ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/3/2005.
2. ☒ The allowed claim(s) is/are 1-20 and 23-29.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Steven Capella on 5/10/2005. The amendment filed 5/3/2005 has been entered.

In the claims:

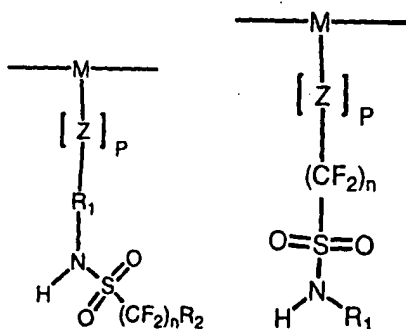
In claim 2, delete the third drawn structure.

In each of claims 2 and 3, insert a period after the last drawn structure.

In claim 26, lines 1-2, change "13 further comprising further comprising" to -- 13, wherein the resist composition further comprises --.

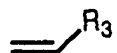
Replace claims 1 and 13 with the following amended versions:

1. (currently amended) A negative resist composition comprising a polymer, the polymer comprising at least one fluorosulfonamide monomer unit having one of the following two formulae:



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wherein M is a polymerizable backbone moiety which is



where R₃ is hydrogen, a linear or branched alkyl group of 1 to 20 carbons, a semi- or perfluorinated linear or branched alkyl group of 1 to 20 carbons, or CN;

Z is a linking moiety selected from the group consisting of $-\text{C}(\text{O})\text{O}-$, $-\text{C}(\text{O})-$, $-\text{OC}(\text{O})-$, $-\text{O}-\text{C}(\text{O})-\text{C}(\text{O})-\text{O}-$, and alkyl;

P is 0 or 1;

R₁ is a linear or branched alkyl group of 1 to 20 carbons;

R₂ is hydrogen, fluorine, a linear or branched alkyl group of 1 to 6 carbons, or a semi- or perfluorinated linear or branched alkyl group of 1 to 6 carbons; and

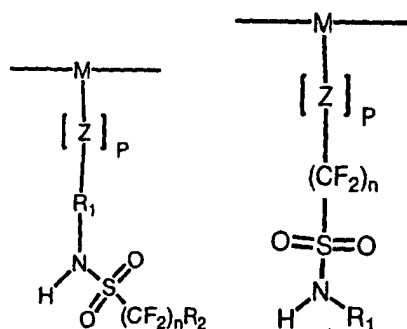
n is an integer from 1 to 6.

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13. (currently amended) A method of forming a patterned material layer on a substrate, the method comprising:

(a) providing a substrate having a material layer on a surface;

(b) applying a resist composition to the substrate to form a resist layer on the material layer, the resist composition comprising a polymer, the polymer comprising at least one fluorosulfonamide monomer unit having one of the following two formulae:



wherein M is a polymerizable backbone moiety which is



where R_3 is hydrogen, a linear or branched alkyl group of 1 to 20 carbons, a semi- or perfluorinated linear or branched alkyl group of 1 to 20 carbons, or CN;

Z is a linking moiety selected from the group consisting of $-\text{C}(\text{O})\text{O}-$, $-\text{C}(\text{O})-$, $-\text{OC}(\text{O})-$, $-\text{O}-\text{C}(\text{O})-\text{C}(\text{O})-\text{O}-$, and alkyl;

P is 0 or 1;

R_1 is a linear or branched alkyl group of 1 to 20 carbons;

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R₂ is hydrogen, fluorine, a linear or branched alkyl group of 1 to 6 carbons, or a semi- or perfluorinated linear or branched alkyl group of 1 to 6 carbons; and

n is an integer from 1 to 6;

(c) patternwise exposing the resist layer to imaging radiation;

(d) removing portions of the resist layer not exposed to the imaging radiation in step (c) to create spaces in the resist layer corresponding to the pattern; and

(e) removing portions of the material layer at the spaces formed in step (d), thereby forming the patterned material layer.

Supplemental Reasons for Allowance

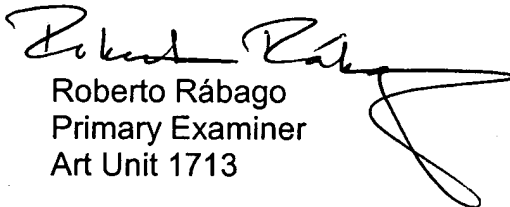
2. Upon further review of previously cited US 6,420,503, earlier comments regarding this reference are amended herein. The disclosure at col. 10, lines 3-6, notes resistance to both deep UV and reactive ion etching, and this passage is clearly referring to the use of the disclosed polymers as a resist in a lithographic process of making a patterned device. Although the reference discloses polymers comprising a backbone which is made from an olefinically unsaturated fragment, and further includes the specified side chain, the reference polymers are not within the scope of the claims as currently amended. No motivation can be found for modifying the disclosed polymers to make the claimed structure which includes the required polymerizable backbone moiety.

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3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberto Rábago whose telephone number is (571) 272-1109. The examiner can normally be reached on Monday - Friday from 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Roberto Rábago
Primary Examiner
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RR
May 10, 2005